

Ohio Agricultural Experiment Station

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THE COUNTY EXPERIMENT FARM ITS FUNCTION, SELECTION AND MANAGEMENT

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The work of the Ohio Experiment Station includes a general survey of the soils of the State and the study of measures for increasing and maintaining their fertility through the rotation of crops and the use of manures and fertilizers; the comparison of varieties of grains, grasses and forage crops and the adaptation of different varieties to the different soils of the State; the improvement of varieties by selection and breeding, and the dissemination of improved sorts; the feeding and care of live stock for the more economical production of meat, milk, wool and eggs; the identification and control of weeds, and of the fungus diseases of plants; the study of the habits of injurious insects and of measures for their control; the production, composition and care of manure, and the effect of manures and chemical fertilizers on the yield and quality of the crop; a survey of the forests and farm woodlots of the State and the study of measures for their preservation and improvement; the care of orchards, the comparison of varieties of fruits and vegetables, and the increase of fruit production through mulching, fertilizing and manuring; and the study of the fundamental principles governing the nutrition and growth of animals, with special reference to the function of the mineral elements in the animal economy.

For the prosecution of this work the Station is organized in eleven scientific departments, each in charge of a chief with a staff of assistants who have become proficient in the special line of investigation pursued in that department; about sixty persons being constantly employed in this manner, together with a force of 150 to 200 foremen, clerks and laborers, the number varying with the season. The Station possesses extensive chemical and biological laboratories, furnished with the most perfect equipment for research known to modern science, together with a library of more than 8,000 volumes, containing the latest results of the scientific investigations in agriculture which are being conducted throughout the world.

In these laboratories are studied the results of the field experiments which the Station is conducting on the main station farm at Wooster and on eight district and county experiment farms located in Cuyahoga, Meigs, Montgomery, Hancock, Paulding, Miami, Hamilton and Clermont counties.

On each of these outlying farms certain parts of the work at the main Station are being duplicated in order to ascertain to what extent the results attained there may be accepted as applicable to the soil and climatic conditions of the several counties, while on each of them additional problems of local importance are brought under investigation, such as the culture of tobacco in Montgomery County and of sugar beets in Paulding County; swine husbandry in Miami County; sheep husbandry in Meigs County, &c.

The results of this work show that a variety of crop, or a method of management, which may be the best possible for one type of soil or climatic or economic condition, may be altogether unsuited to another; and that the only possible way in which the Station can give adequate service to all the citizens of the State is by bringing under investigation all the soil formations.

Cooperative experiment not successful: Repeated attempts have been made to accomplish this purpose through cooperation with farmers in the conduct of experiments on their farms, but while many farmers have rendered invaluable assistance in this work, time has demonstrated that the attainment of trustworthy results in investigation of this character involves a sacrifice which the private farmer cannot afford to make.

In the study of soil fertility for example, certain areas must be left continuously without manure or fertilizers, and the farmer soon perceives that these areas are producing an undesirable unevenness in his fields, while in the general conduct of the work, whether in the study of soil fertility or the comparison of varieties, there must be a close attention to detail and an exactitude in all the work which

enormously increases the cost of producing the crop. Moreover, the time frequently comes when it is a question of a little neglect of the experiment or a large loss in other crops of the farm, and in such contingencies the experiment usually suffers. Furthermore, experience has demonstrated that this work must be carried over a long period of years if it is to attain positive value, because of the effect of seasonal variations; the results of one season sometimes being exactly the opposite of those attained under average conditions.

The experiment must be divorced from profit: For these reasons it has been found absolutely essential that the proper carrying out of the experiment be made the paramount object in the conduct of this work, without reference to the value of the crop or to the effect on the land, and also that the work shall be so organized as to be continued without interruption for an indefinite period. These objects can only be attained successfully on land, the ownership of which is vested in the State or County, and under management which has no pecuniary interest in the crops produced. The work is, in fact, like any other public work, a system of joint cooperation under which all the citizens of a community, county or state, contribute towards an object which in itself has no pecuniary value, but which may be of great value to the individual contributors. It is simply another form of that organized effort which is exemplified in the construction of roads and drains, the building of school houses and the maintenance in them of public schools.

No private farmer of ordinary wealth can afford to equip and maintain an experiment farm and donate it to the public with sufficient endowment for its perpetual support. Only once in all the history of the world has this been done, namely: in the case of the Rothamsted Experiment Station. But what is impossible or impracticable for the individual farmer may mean for the average taxpayer an expenditure as insignificant as the cost of a two-for-a-nickel cigar once a month for ten years and once every two months thereafter.

WHAT CAN THE COUNTY EXPERIMENT FARM ACCOMPLISH?

But even so insignificant an expenditure as this should not be encouraged unless the resulting benefit is likely to be greater than that from the cheap cigar, and it is reasonable to ask what benefit the farmer may expect from the experiment farm.

What has been done: For 10 years the Ohio Experiment Station has produced an average yield of 77 bushels of shelled corn per acre, followed by 60 bushels of oats, 33 bushels of wheat and 3 tons of hay; these crops being grown in a 4-year rotation of corn, oats,

wheat and clover, 10 acres in each crop every season. Estimating corn at half a dollar per bushel, oats at one-third of a dollar, wheat at 90 cents and hay at ten dollars per ton, these crops would have a total value per acre for each four years of \$118.20 or \$29.55 annually. To produce these yields the corn crop has received a dressing of manure produced on the farm, the manure being reenforced with phosphorus and followed by lime and fertilizing materials costing a total of \$14.00 for each 4-year rotation or \$3.50 annually per acre.

During the same period Wayne County has produced annually 38 bushels of corn, 18½ bushels of wheat, forty bushels of oats and a ton and a half of hay, which, at the same valuation would have a total value of \$64.00, or \$16.00 annually. To produce these yields the County has expended about 50 cents per acre annually for fertilizers. The net value for Wayne County's crops has therefore been \$15.50 annually, as against more than \$26.00 annually for those produced at the Experiment Station

The land on which these crops have been grown at the Experiment Station is certainly not above the average of the county in its natural fertility. It has been thoroughly drained, but on land on the same farm and equally well drained the yields under ordinary management have not been greater than those produced on similarly drained lands by Wayne County farmers when ordinary methods of treatment were followed. There is therefore no reason to doubt that were the methods which the Station has worked out put in practice over the farms of the County as a whole it would be possible to increase the net income of these farms within ten years time by more than a million dollars annually.

The extra cost: It is true that this increase would only be accomplished by an additional expenditure for labor, as well as for lime and fertilizers, and while it would be an easy matter to borrow the money necessary to provide the fertilizing materials it is becoming more and more difficult to secure efficient labor at any price.

But with the same labor now employed it would be possible to produce the crops now grown in Wayne County on two-thirds of the land now in cultivation, were the energy, which is now wasted in traveling over acres which cannot possibly produce a full crop, concentrated on fewer acres of selected land, leaving the remainder in grass to regain its wasted fertility.

A few farmers in Wayne County are realizing the possibility of improving their methods. More lime is being used every year; fertilizers are being used more argely and more intelligently; the fertilizer agent, with his plausible stories, fancy brands and exorbitant prices, is finding fewer customers; dealers who were selling a

14 percent acid phosphate a few years ago at \$17.00 to \$18.00 per ton are now offering a better grade for considerably less money, and all this has come from the teaching of the Experiment Station, which for nearly 20 years has been telling the farmers how to buy their fertilizing materials and mix them for themselves, and how to double the effectiveness of their barnyard manure, and has been supporting the advice thus given by actual demonstration in the Station fields.

Not all are convinced: Of course, the old saying has held true, that you can lead a horse to water but you cannot make him drink, and there are still many farmers in Wayne County who have never visited the Experiment Station and some who never will. There are still farmers who do not believe that there is any place in farming for modern science, but think that the methods of a generation ago cannot be improved upon. There are others more open-minded but who have not realized the fact, that such work as the Station is doing must be continued through a large number of our changing seasons before definite results can be announced, and there are many who have not appreciated the necessity for the costly methods which have been followed in order to secure the utmost accuracy in results. But the number of those who obtain a more correct understanding of the Station's methods and make larger use of its work is steadily increasing.

In other lines of work than the treatment of the soil the Experiment Station is prepared to assist the farmer. From its first organization it has made comparative tests of varieties of grains, fruits and vegetables, by growing them side by side with the utmost care to secure uniformity in soil and treatment. This work has demonstrated the necessity for long continuance and for extreme caution in drawing conclusions. A variety may show the greatest promise under one seasonal or soil condition and utterly fail under another. Certain varieties which have proved most successful in Wayne County have been found inferior in other counties, and vice versa, and this is one of the leading reasons for the establishment of experiment farms on all the principal soil types of the State. Both variety and soil treatment must be modified for each soil formation.

In the care of orchards the Experiment Station has performed a most useful service. Fifty years ago apples were counted as sure a crop in Ohio as corn or wheat. From every farm orchard this king of fruits was gathered by the wagon load as regularly as October came around. But soon after this time there began to come seasons when the apple crop failed. These seasons increased in frequency

until they became the rule, and it was only after long intervals that a full crop was gathered. That this was not altogether due to the increasing age of the trees was shown by the fact that young orchards gave no better yields than the older ones. The trouble was first ascribed to increase of insect pests, and this was one of the causes, but the principal source of loss was a fungus parasite, the apple scab.

The Ohio Experiment Station was one of the first to take up the treatment of this pest and reduce it to a practical basis. Working in its own orchard and in leased orchards, it contributed materially to the working out of efficient and economical methods of control. But the apple scab was hardly mastered before a much more serious pest appeared in the San Jose scale, an insect absolutely unknown on this continent half a century ago, and which destroys trees as well as fruits. But this pest has also been met and mastered, and the means for its control have been made plain by the Station's work.

In various sections of the State, from the Lake to Lawrence County, individual orchardists have profited by the Station's work and have demonstrated its practicability to their great advantage, but these have been comparatively few. The greater number of Ohio's orchards are still uncared for and unproductive.

Washington County was one of the greatest apple producing counties in the State in its early history. It was from here that "Johnny Appleseed" started on his mission in pioneer times, and in ante-bellum days apples were flat-boated down the river from Marietta to supply the southern markets. But Washington County suffered with the remainder of the State from the causes which destroyed the apple crop. The old orchards suffered not only from insects and fungi but from starvation as well, and the young orchards did very little better.

A reclaimed orchard: About four years ago the Station Horticulturist visited Washington County, and leased an acre of land in an orchard which had been condemned to the axe because of its unfruitfulness. From that acre the owner sold \$400 worth of apples, while the remainder of the orchard produced practically nothing. Instead of cutting down his orchard he planted more, and whereas he had vainly sought a buyer for the farm containing this orchard at \$3,500 he now refused \$5,500 for a half interest in it. The people of the county visited this orchard and two others in other parts of the County in which similar work had been done. They went home and trimmed and sprayed and fertilized their trees and within two years Washington County had sold \$200,000 worth of apples from orchards that had been considered worthless.

And yet the Experiment Station had been publishing bulletins for nearly 20 years on orchard spraying, describing the method and furnishing complete evidence of its value and practicability.

Why the work moves slowly: Some of the reasons for the slowness with which farmers adopt new methods are their doubt as to whether these methods are applicable to their particular conditions of soil and climate; their fear that the new method may not work out as well in their hands as in those of experts, and the fact that their time and their limited capital are so completely consumed under existing methods that they do not see their way to add to their present labor and expense.

Had the manufacturers of agricultural machinery contented themselves with piling up their machines in warehouses and advertising their product only in bulletins to be sent to farmers who might take the trouble to ask for them, the condition of our agriculture would have been far different from what it is today, with reference to mechanical equipment. And had the manufacturers and dealers in commercial fertilizers waited for the farmers to learn of their fertilizers through voluntary effort, the course of that industry also would have had a very different history.

But the agents for farm machines and for fertilizers have visited every farmer on his farm. The machine agent has taken his machines with him and exhibited their working, and has not left the field until the farmer himself was in the seat of the harvester or had the handles of the improved plow or cultivator in his hands and the agent had the farmer's note in his pocket. The fertilizer agent has been not less persistent; the virtues of his goods have been extolled in the most persuasive language, and the farmer's lack of acquaintance with chemical terms has made it possible to induce him to pay prices for his fertilizers that were far above their necessary cost.

The cost of our mechanical progress: Both the machine agent and the fertilizer agent have performed a valuable service. Without their help our agriculture would have been far behind what it is today, but their help has been purchased at an enormous expense to the farmer. It is a most conservative estimate to put the annual cost of persuading the Ohio farmer to use improved machinery or to fertilize his fields more liberally at hundreds of thousands of dollars. And every cent of this cost comes off the farm in the ultimate analysis.

This is not saying that farmers are peculiar in this respect. The traveling agent pervades every line of business and the city merchant pays for his services as regularly as does the farmer; it is

simply a phase of human nature, of the wholesome conservatism which causes the most of us to hesitate about embarking in new ventures until the superiority of the new over the old has been demonstrated before our eyes. We all have to be shown!

Mechanical invention has done its greatest work for the farm: There will be further progress but there cannot be as great an advance over present attainment in this direction as there has been, in the space of a single lifetime, between the sickle and flail of the middle of the last century and the combined harvester of today, reaping and threshing fifty acres a day. Mechanical invention has made it possible for the farmer of today to cultivate many more acres than he could have done sixty years ago, but to accomplish this the laborers who formerly helped to till his fields and harvest his crops are now building his machinery in city shops; consequently our farm population is both relatively and absolutely smaller than it was then. But mechanical invention has not increased the yield per acre. On the contrary, every improvement in tillage and harvesting machinery has tended to the more complete exhaustion of the fertility of the land, by making it cheaper to bring additional acres under cultivation than to increase the yield of the present acreage by drainage, manuring and fertilizing.

We have reached the limit of free land. The free ranges and free farms, the exploitation of which during the last quarter of the nineteenth century so depressed the prices of farm produce and live stock, are free no longer. The tide of migration, for three centuries setting steadily westward, has turned eastward. Ohio, settled originally from the eastern states, is now receiving a stream of farmer immigrants from Illinois, who are coming to Ohio to find cheaper lands than those of Illinois or westward. Land values are rising by leaps and bounds, and the United States, formerly the greatest exporter of foodstuffs in the world, is now importing both corn and meat. All this means that the acre must be taught to yield more food than it has ever yet done in this country, if our present rate of increase of population is to be maintained and the people adequately fed.

It is possible to enormously increase the acre's yield, and to accomplish this by measures within reach of every farmer. This is being abundantly demonstrated. These measures have been worked out and described in bulletins, in the agricultural press, and in the farmers' institute, and yet Ohio's yields of corn and wheat are not more than two bushels per acre greater than they were 60 years ago. Evidently the time has come when the methods, which have forwarded the advancement in the mechanical side of farming, must be

adapted to the encouragement of the adoption of a system of farm practice, which shall make use of the knowledge which modern science has given us concerning the functions of drainage and crop rotation, the means for increasing the production and conservation of farm manures, and the principles governing the most effective use of fertilizing materials.

The farmer who wielded the sickle and the flail depended upon the strength of his muscles for the success of his work; the farmer who drives the modern machine must have some of the attributes of the mechanic; but the farmer who meets the requirements of the agriculture of today must be able to direct his work in the light of the revelations of modern science. The agriculture of the future will be as truly a "learned profession" as law or medicine.

The county agricultural agent: Because the great majority of farmers have not had and cannot have the opportunity for study which it is the province of the agricultural college to furnish, the plan has been adopted of employing county agricultural agents, who are expected to be men who have had some training in the elementary sciences which relate to the work of the farm, and who are therefore able to assist the farmer in making use of the help which these sciences offer him. These county agents cannot be experts in all lines of farm practice on the one hand nor of agricultural science on the other. The man who covers such a field does not live, for it is the broadest and most intricate field of human endeavor; but they are expected to be able to recognize some of the difficulties which beset the farmer and to bring to him the assistance of experts in these several lines.

The county agent will not be an expert in entomology or botany, but he will be able to identify the more common insects, weeds and plant diseases, and to suggest practical measures for their control. He will not be an expert chemist, but he will have sufficient knowledge of the chemistry of the farm to advise in the planning of systems of crop rotation and fertilizing adapted to individual circumstances, and he will have in this work the assistance of an experiment farm on which will be tested the result of the studies in soil fertility conducted at the Experiment Station and at the experiment farms of other counties, all being done under the direction of those who are making such investigations their life work. In such ways as these the county agent will be able on the one hand to help the farmer in the solution of his problems, and on the other to assist those charged with the work of the Experiment Station, by conducting at the county experiment farms such special lines of investigation as may be carried on at these farms to better advantage than at the Experiment Station.

The county agent will be more efficient because of the opportunity for verification and demonstration which the county experiment farm will afford, and the combining of the county agency with the superintendence of the experiment farm will place the agency on a more permanent and stable basis than it can be when dependent upon popular subscription for its support, while it will make it possible to secure men of greater ability as superintendents of the farms. Hence this arrangement will promote efficiency in both agency and farm and at the same time will reduce expenses.

Better seeds: One of the lines of work undertaken at the county experiment farms is the production and distribution of seed grains of such varieties as shall prove best adapted to the localities in which the farms are situated. This is a work which can be performed to only a limited extent at the Experiment Station, for the reason that experience has shown that the success of a particular variety under one set of soil and climatic conditions is not sufficient evidence that it will succeed equally well under different conditions, and therefore that the varieties best adapted to a given region must be learned by actual test in that region; and experience has also shown that, in the case of corn especially, the seed should be grown as nearly as possible under the same climatic conditions as those under which the crop is to be grown. For these reasons, therefore, the Wayne county farm of the Experiment Station can be little more than a county experiment farm, so far as its service in the production of seed grains is concerned, and to a considerable degree this is also true of its function in the testing of fertilizers. It is quite certain, for example, that the results which have followed the use of lime on the Wayne county farm, though marking a revolution in the agriculture of that and other counties in the eastern half of the State, cannot be expected so generally in the western half.

Organization: One of the signal services which the county agents have already rendered the farmers is the bringing them together in organizations for the purchase of fertilizers, seeds and other supplies. In this respect alone the farmers of the few counties in which agents were first established have saved thousands of dollars. Such cooperative buying as this does not mean the destruction of any legitimate industry, but simply the bringing of buyer and seller together on a fair and equitable basis. The outcome of this work already has been a marked reduction in prices by dealers in fertilizers. In short, the whole county experiment farm and county agricultural agency proposition is one of cooperative organization—the getting together for united effort in the improvement of the business conditions of the community, not merely of the farmer.

for the more nearly business is organized on business principles the more money there will be for the conduct of all legitimate business. Those who would exploit the farmer for their personal gain may suffer, but those who would conduct their business on the principle that he serves himself best who serve others best will profit by the change, whether they be farmers or business men.

HOW TO SECURE A COUNTY EXPERIMENT FARM

In the appendix to this circular is given the text of the law authorizing the establishment of county experiment farms. Briefly, the first step to secure such a farm is to obtain the signatures of five percent of the voters of the county, based upon the votes for governor at the last preceding election, to a petition addressed to the county commissioners, requesting them to submit at the next general election a proposition to establish an experiment farm within the county. These petitions should be filed with the County Auditor about six weeks before the date of the election. Upon the receipt of petitions containing the requisite number of signatures it is the duty of the commissioners to provide for a vote upon the proposition, and to advertise their intention to do so for at least four weeks prior to the election.

Petitions not sufficient: It will not do, however, to stop with getting the petitions signed. Experience has shown that the purpose and function of the experiment farm has been very generally misunderstood, and this especially by the farmers themselves. The Ohio Experiment Station publishes a larger edition of its bulletins than any other similar institution; these bulletins are sent free to any Ohio farmer who asks for them, and yet not one in four of the farmers of Ohio has considered it worth while to spend the price of a postal card in making this request. It is not surprising, therefore, that whenever the proposition to establish a county experiment farm has been submitted to vote the opposition has come chiefly from farmers. The existence and support of all institutions for the advancement of agriculture, or of any other phase of human progress, for that matter, is dependent upon the missionary effort of the few whose vision is clearer than that of the masses, and who possess the spirit of altruism and the power of leadership.

In entering upon a campaign for the establishment of an experiment farm, therefore, the first step should be the organization of a county improvement association to direct the work, and this should be followed by the holding of meetings in every school district in the county to explain the purpose of the movement and its expected benefits. The distribution of literature on the subject will help, and

the Experiment Station will furnish such literature, but this alone is not sufficient. There are too many who do not read understandingly; or whose opposition must be overcome by personal explanation before they will read at all.

What is required for a county experiment farm: The law requires that a county experiment farm shall contain not less than 80 acres of land. The purpose of this requirement is that there shall be enough land to provide employment for at least one man and team throughout the year. On every farm there must be 15 to 20 acres of land, uniform in quality of soil, and lying sufficiently level to be adapted to plot experiments. In this work the plots are made to contain one-tenth acre each and at least 30 are required to provide for the simplest experiment in the rotation of crops and the use of fertilizers, and there are but few counties in which there should not be two or three different rotations established in order to adequately study the agricultural possibilities of the county. In addition to the work with field crops there should also be provision made for orchard studies in every county.

In planning these experiments it is the policy of the Experiment Station to so lay out the work that certain parts of it will articulate with that in progress at the main station, while other parts are made to cover problems that have not been put under investigation elsewhere, or those which are of special interest in the particular locality. Without this articulation of the work it would be much less effective because there would be no means for definite comparison between different methods.

Plan of management for county experiment farms: The law provides that the county experiment farms shall be under the management of the Director of the Experiment Station. This provision is made in order to secure that efficiency which can only be obtained through the large experience of the Experiment Station, and to avoid the wasteful duplication which would result from the employment of additional staffs of scientific workers with their costly laboratories to conduct work which the Experiment Station is prepared to do far more effectively than would be possible to any individual county. In other words, the scientific laboratories of the Experiment Station, with their equipment, will represent when completed an expenditure of \$150,000, and their maintenance amounts to an annual cost of an equal sum. Such an expenditure is manifestly impossible for any single county except those in which the great cities are located, and it is impracticable for these; but when maintained by the State the services of this scientific establishment are made as available to each separate county as though it were

located within the county. Moreover, one of the functions of the county experiment farm is to make the scientific work of the Experiment Station more effective by providing in each county a point where such work may be conducted under such conditions of permanency of tenure and freedom from interruption as are absolutely essential to its success. For this reason the Experiment Station will expend more money in the support of each county experiment farm than the county itself is required to furnish, after the farm and its equipment have been provided.

The equipment of a county experiment farm consists of such dwellings, barns, teams and implements as are required for the conduct of an ordinary farm, together with more or less underdrainage. For the land intended for field experiments it is essential that the drainage shall be thorough, as unequal drainage may have a greater effect on the outcome of such an experiment than any other differences in treatment.

It is not necessary nor advisable that the dwellings on a county experiment farm be pretentious. A house of 6 to 8 rooms for the foreman with sometimes a smaller one for a second man, and a plain barn, are all that are essential, but these should be in good repair. Where these buildings have to be erected their cost cannot be estimated at less than \$4,000 under present high prices for skilled labor and building material. The average county experiment farm will require two teams which, with necessary implements and machinery, will involve an expenditure of \$3,500 or more, and the average cost of drainage and fencing may be put at \$1,500. The cost of the county experiment farms thus far established has been as follows:

County	Acres	Cost of land	Bond issue
Paulding.....	92	\$16 260	\$20 000
Miami.....	123	18 855	20 000
Clermont.....	130	6 500	12 000
Hamilton.....	216	25 000	40 000
Washington.....	180	15 550	20 000

The Paulding County farm had no buildings and not more than half the necessary drainage. The Miami County farm has two small dwellings and much less than half the necessary drainage. An additional barn and considerable fencing were required. The Clermont County farm had an old house, much in need of repairs, the skeleton only of a barn, and no drainage. The Hamilton County farm had two sets of buildings, both sets much in need of repairs, and no drainage. The Washington County farm, established in

April, 1914, is in two tracts, one of 170 acres at Fleming, and a truck garden of 10 acres 4 miles north of Marietta, with fair buildings on each tract.

The superintendence of the county experiment farm: As stated above, the general management of the county experiment farms is in the hands of the Director of the Experiment Station. In order to provide for greater efficiency in management and greater usefulness to the county the Agricultural Commission of Ohio, which is the governing board of the Experiment Station, has decided to place a County Agricultural Agent in each county establishing a county experiment farm. This County Agent whose qualifications and functions are described on a previous page, will be the Superintendent, under the Director, of the experiment farm. When practicable he will reside on the farm, but in some cases it has been necessary for him to live in town. His salary will be paid by the Experiment Station. The actual work of the farm is performed by a working foreman, who employs such additional labor as may be required to carry on the work. The wages of this foreman and his helpers are paid from funds provided by the county and from the proceeds of the farm. In addition to the County Agents the Director is assisted in the management of county experiment farms by a Field Assistant, who visits each farm every two or three weeks, and by this frequent inspection is able to keep their work thoroughly coordinated.

The proceeds of the county experiment farm: The crops produced on the county experiment farms are sold and the proceeds devoted to the payment of wages and other expenses incidental to the maintenance of the farm equipment. The law provides that any excess over the amount required for these purposes shall be turned into the county treasury, but during the first few years of the work of these farms there will be no such excess. As a rule, farms in a low state of productiveness are purposely selected for this purpose, because the improvement of an exhausted soil is a more effective object lesson than the maintenance of an already good condition, and even in the latter case the arrangement of crops and the drainage which is invariably necessary involve some losses in crop production at first, so that it will always be some years before the county experiment farm can be brought to a condition of full productiveness. It must be remembered, moreover, that--

The function of an experiment farm is not to make money, but to work out methods which the ordinary farmer may apply to his own farm with advantage. To illustrate: The work of the Experiment Station has shown that the maximum average yield of

wheat is produced by a rate of seeding of about eight pecks per acre, the yield falling off if the seeding varies more than half a bushel either way from this quantity. This work has necessarily been conducted on small plots of land, usually containing one-tenth acre each, for to use larger plots for the many hundreds of different tests under way at this Station would require more land than it has been possible to secure of sufficient uniformity for a trustworthy test of this character. The plots are 16 feet wide, and each plot contains 24 rows of wheat. If, now, a careless driver permits two rows to be run together, he gets too much seed in one strip and too little in another, thus lowering the yield on both, and as each pound of wheat on one of these plots represents ten pounds per acre, the calculated results may be very far from the actual truth. The same error follows if one of the runs becomes obstructed, thus reducing the quantity of seed sown. To guard against such errors two men are sent out with the drill, one to drive and one to watch the seeding, and similar care must be exercised in harvesting and threshing the crop. To the individual farmer a bushel or so difference in yield is a small matter, but on the experiment farm, where such differences are to be taken as a guide to the practice of the thousands of farmers of the county, it is an altogether different proposition. For this reason there must be an expenditure of labor in seeding and harvesting, in weighing and measuring, and in the calculation of results on the experiment farm that is quite superfluous on the ordinary business farm, and this work must be performed by men of larger intellectual capacity and training, and who therefore command higher wages, than are required for the performance of ordinary manual labor.

Tax duplicates and land values: The following table shows the total value of property in each county of the State, the total value of land and the average value per acre, together with the amount which it would be necessary to levy on each thousand dollars of valuation to raise a fund of twenty thousand dollars. In many counties this amount would be sufficient to establish and equip a county experiment farm; but where land values are very high, a larger sum should be provided.

It is seldom possible or desirable to limit the area of the experiment farm to 80 acres, and the necessity for securing an accessible location usually enhances the price demanded, so that the farm will generally cost considerably more per acre than the average farm lands of the county are valued at for taxation.

APPENDIX

Total value of property as listed for taxation in Ohio in 1912; amount necessary to levy on each thousand dollars of valuation to produce a fund of twenty thousand dollars, and average value of land per acre.

County	Total value of property	Levy	Value per acre	County	Total value of property	Levy	Value per acre
Adams.....	\$12 823,700	\$1.559	\$20.67	Henry.....	\$37,166,900	\$.538	\$94.58
Allen.....	81,199,020	.246	89.45	Highland.....	30,160,640	.663	47.68
Ashland.....	38,662,740	.517	64.33	Hocking.....	20,512,175	.975	27.33
Ashtabula.....	82,577,320	.242	52.74	Holmes.....	24,090,150	.830	55.72
Athens.....	34,708,985	.576	33.45	Huron.....	58,551,875	.342	69.81
Auglaize.....	43,815,805	.456	86.74	Jackson.....	17,429,656	1.142	18.74
Belmont.....	70,918,795	.282	65.74	Jefferson.....	76,779,610	.260	114.00
Brown.....	20,798,787	.962	42.86	Knox.....	47,042,380	.425	61.03
Butler.....	110,767,880	.181	101.67	Lake.....	50,122,320	.399	118.81
Carroll.....	15,720,280	1.272	33.86	Lawrence.....	30,004,016	.667	28.69
Champaign.....	44,083,724	.454	87.94	Licking.....	83,038,235	.241	65.46
Clark.....	87,800,240	.228	98.13	Logan.....	42,023,890	.476	80.47
Clermont.....	25,379,380	.788	48.63	Lorain.....	119,564,165	.167	72.70
Clinton.....	33,802,132	.592	73.34	Lucas.....	261,118,270	.077	101.07
Columbiana.....	89,736,380	.223	61.15	Madison.....	40,718,500	.491	88.20
Coshocton.....	34,265,270	.584	37.14	Mahoning.....	202,472,160	.099	102.05
Crawford.....	54,218,180	.369	83.34	Marion.....	56,882,960	.352	84.30
Cuyahoga.....	900,812,535	.022	108.74	Medina.....	38,814,345	.515	59.23
Darke.....	67,755,314	.295	100.01	Meigs.....	16,303,370	1.227	26.68
Defiance.....	36,605,880	.547	81.01	Mercer.....	40,092,070	.499	91.83
Delaware.....	40,693,010	.492	71.51	Miami.....	66,850,280	.299	100.78
Erie.....	62,729,490	.319	97.46	Monroe.....	19,130,925	1.045	36.86
Fairfield.....	58,194,630	.344	77.15	Montgomery.....	205,538,830	.097	139.01
Fayette.....	37,125,138	.539	88.69	Morgan.....	14,527,420	1.377	30.66
Franklin.....	317,538,120	.063	102.26	Morrow.....	25,225,320	.793	55.38
Fulton.....	36,385,770	.550	79.18	Muskingum.....	60,672,172	.329	44.02
Gallia.....	14,131,460	1.415	21.29	Noble.....	14,411,415	1.388	32.83
Geauga.....	16,751,540	1.194	38.59	Ottawa.....	35,400,440	.564	116.77
Greene.....	41,921,841	.478	88.73	Paulding.....	34,598,150	.575	92.87
Guernsey.....	35,839,068	.558	40.01	Perry.....	27,724,524	.721	39.17
Hamilton.....	614,008,700	.033	88.97	Pickaway.....	47,081,031	.425	92.80
Hancock.....	62,871,720	.318	90.83	Pike.....	10,864,515	1.841	20.49
Hardin.....	48,311,190	.414	83.25	Portage.....	48,835,205	.410	51.45
Harrison.....	26,281,350	.761	38.28	Preble.....	39,899,084	.502	80.95

Total value of property as listed for taxation in Ohio in 1912; amount necessary to levy on each thousand dollars of valuation to produce a fund of twenty thousand dollars, and average value of land per acre.—Concluded.

County	Total value of property	Levy	Value per acre	County	Total value of property	Levy	Value per acre
Putnam	\$41,606,150	\$.481	\$87.84	Tuscarawas ...	\$69,168,510	\$.289	\$74.00
Richland	65,191,430	.307	60.60	Union	36,190,370	.553	75.43
Ross	48,388,800	.413	43.43	Van Wert.....	47,555,420	.421	95.02
Sandusky	61,569,385	.325	93.75	Vinton	9,820,959	2.036	15.73
Scioto.....	49,031,690	.408	23.15	Warren.....	33,330,012	.600	63.17
Seneca.....	68,772,960	.291	85.51	Washington....	42,473,170	.471	32.86
Shelby.....	37,949,330	.527	88.51	Wayne.....	63,814,620	.313	73.64
Stark.....	159,502,250	.126	120.99	Williams	39,596,240	.505	77.75
Summit.....	155,847,590	.128	78.72	Wood.....	82,975,600	.241	105.16
Trumbull	86,526,140	.231	62.78	Wyandot.....	38,896,650	.514	76.92
State average.....							68.14

THE COUNTY EXPERIMENT FARM LAW

Following is the text of the law authorizing the establishment of county experiment farms in Ohio as amended by the last General Assembly:

Sec. 97. In order to demonstrate the practical application under local conditions of the results of the investigations of the Ohio Agricultural Experiment Station, and for the purpose of increasing the effectiveness of the agriculture of the various counties of the state, the commissioners of any county in the state are hereby authorized and empowered to establish an experiment farm within such county as hereinafter provided for.

Sec. 98. The county experiment farms established under this act shall be used for the comparison of varieties and methods of culture of field crops, fruits and garden vegetables; for the exemplification of methods for controlling insect pests, weeds and plant diseases; for experiments in the feeding of domestic animals and in the control of animal diseases; for illustrations of the culture of forest trees and the management of farm woodlots; and for the demonstration of the effects of drainage, crop rotation, manures and fertilizers or for such part of the above lines of work as it may be practicable to carry on.

Sec. 99. Upon the filing of a petition with the county auditor signed by not less than five percent of the electors, based upon the vote for governor at the last preceding election, residing within the county, the commissioners of such county shall submit to the qualified voters of such county a proposition to establish an experiment farm within such county, and to issue notes or bonds for the purchase and equipment of such farm, such proposition to be voted upon at the next general election following the receipt of the petition by the commissioners. Notice of the intention to submit such proposition shall be published by the county commissioners in two newspapers of opposite politics printed and of general circulation in said county, for at least four weeks prior to the election at which the proposition is to be voted upon, together with a statement of the maximum amount of money which it is proposed to expend in the purchase and equipment of such farm.

Sec. 100. The county auditor shall file a written request with the board of deputy supervisors of elections asking for the preparation of the necessary ballots, which ballots shall be separate and apart from all other ballots, and which ballots shall have printed thereon "Tax for experiment farm—Yes;" "Tax for experiment farm—No." The result of such election shall be ascertained by the board of deputy supervisors of elections and the result thereof certified to the county auditor.

Sec. 101. If a majority of the electors voting on such proposition in the county are in favor of establishing such experiment farm then, the commissioners of the county shall levy a tax on all the taxable property in such county as listed for taxation on the county duplicate, which levy shall not exceed one-fifth of one mill on the dollar of the taxable property of the county in any one year, nor shall the aggregate of all levies for such purpose exceed two mills on the dollar.

Sec. 102. To anticipate the collection of the tax authorized by this act and the use of the money to be raised thereby, the commissioners are hereby authorized and required, within ninety days from the date of the election at which such bonds have been authorized, to issue the notes or bonds of their county. Such notes or bonds shall bear interest at a rate not to exceed six percent per annum, and shall run not to exceed ten years, and shall not be sold for less than their par value, and the proceeds of the sale thereof shall be deposited in the county treasury subject to the order of the agricultural commission to be applied by the agricultural commission to the purchase and equipment of an experiment farm, containing eighty acres or more, as herein after provided for.

Sec. 103. When the funds provided for in this act are deposited in the county treasury, the commissioners shall notify the agricultural commission of their action, on receipt of which notice it shall be the duty of the agricultural commission to visit the county and select a farm for the purpose specified in this act.

Sec. 104. The equipment of an experiment farm shall consist of such buildings, drains, fences, implements, live stock, stock feed and teams as shall be deemed necessary by the agricultural commission for the successful work of such farm, and the initial equipment shall be provided by the county in which the farm is established, together with a sufficient fund to pay the wages of the laborers required to conduct the work of such farm during the first season. With the beginning of operations of said farm the county commissioners shall appropriate for the payment of the wages of the laborers employed in the management of such farms as may be established under this act, and for the purchase of supplies and materials necessary to the proper conduct of such farms such sums not exceeding two thousand dollars annually for any farm, as may be required by the agricultural commission, said agricultural commission to render an annual itemized financial statement to the board of county commissioners of all receipts and expenditures connected with the management of the experiment farms.

Sec. 105. The management of all county experiment farms established under authority of this act shall be vested in the director of the Ohio agricultural experiment station, who shall appoint all employees and plan and execute the work to be carried on, in such manner as in his judgment will most effectively serve the agricultural interests of the county in which such farm may be located, the director and all employees being governed by the general rules and regulations of the agricultural commission.

Sec. 106. Before entering upon any line of investigation or demonstration upon any of the county experiment farms established under this act, the director of the experiment station shall submit a written plan of such contemplated work to an advisory board, consisting of the county agricultural society of the county in which such experiment farm may be located, or if there be no county agricultural society, then of the board of county commissioners of such county,¹ and if such plan is not approved by such advisory board, then the work shall not be undertaken.

Sec. 107. The county commissioners of any county may assign to the agricultural commission, without a vote of the people, such portion of any farm now owned or hereafter acquired by the county as may be mutually agreed upon between the commissioners and the

agricultural commission, the land thus assigned to be occupied and used by the Ohio agricultural experiment station for the purpose specified in this act and under the management of the director of the station.

Sec. 108. The produce of each of such experiment farms as may be established under this act, over and above that required for the support of the teams and live stock kept on the farm, shall be sold and the proceeds applied to the payment of the labor and to the purchase of the supplies and materials required for the proper management of the farm as contemplated by this act, and for the maintenance of its equipment. All surplus beyond these requirements shall be covered into the county treasury and placed to the credit of the general fund of the county, except in the case of the use of farms already belonging to the county, in which case the proceeds shall be placed to the credit of such fund as the county commissioners may designate.

Sec. 109. In case the experiment station shall cease to use for the purpose herein specified any farm established under this act, such farm and its equipment shall be sold at public auction to the highest bidder after notice of such proposed sale shall have been published for four consecutive weeks in two newspapers of opposite politics, once a week, published in and having the largest circulation in the county within which the farm is located, and the proceeds of such sale shall be covered into the county treasury, the sums thus covered to be placed to the credit of the school funds of the county.

Passed April 13, 1910.

Amended April 14 and 15, 1913.